

VIRGINIA

MINERALS



COMMONWEALTH OF VIRGINIA

DEPARTMENT OF MINES, MINERALS AND ENERGY
Richmond, Virginia

Published quarterly by the DIVISION OF MINERAL RESOURCES
900 Natural Resources Drive, Charlottesville, VA 22903

VOL. 43

NOVEMBER 1997

NO. 4

GEOLOGY AND THE CIVIL WAR IN SOUTHWESTERN VIRGINIA: UNION RAIDERS IN THE NEW RIVER VALLEY, MAY 1864

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INTRODUCTION

On Monday, May 9, 1864 - a beautiful sun-splashed day in the mountains of southwestern Virginia - the largest Civil War battle ever fought in that sector of the Old Dominion erupted at the base of Cloyd's Mountain in Pulaski County (Figure 1). Both Yankee and Rebel veterans of that engagement, many of whom had fought in larger and more important battles elsewhere, claimed "that, for fierceness and intensity, Cloyd's Mountain exceeded them all" (Humphreys, 1924, cited in McManus, 1989). Of the roughly 9,000 soldiers engaged, 1,226 became casualties. Union killed, wounded, and missing were approximately 10 percent of their forces and Confederate losses approached an appalling 23 percent.

Next day, May 10, another lovely spring day, Northern and Southern forces clashed again when a fierce two and one-half hour cannon duel broke out about 10 miles east of Cloyd's Mountain at Central Depot (now, the city of Radford) (Figure 1). Here, artillerymen blazed away from opposite sides of the New River to determine whether the crucial railroad bridge over this ancient stream would survive or be destroyed. Among the Federal combatants who fought at Cloyd's Mountain and the New River Bridge were two future presidents of the United States. Perhaps even more intriguingly, a Union cavalryman who fell at the New River proved to be a woman, one of the few females known to have been killed in combat in the entire war!

The little-known battles of Cloyd's Mountain and New River Bridge were fought across classical Appalachian Valley and Ridge topography. What prompted the United States Army in the spring of 1864 to invade this remote part of Virginia, a seemingly unimportant backwater compared to the great battles raging simultaneously in other theaters? How was the campaign conducted across this difficult terrain? What were the results? The answers to these questions reveal profound and fascinating

connections between the geology, geography, and human history of this region. This article, part of an ongoing study examining the relationships between geology and the Civil War in southwestern Virginia (Whisonant 1996a; 1996b), probes these connections.

SALT, LEAD, AND RAILS: THE SIGNIFICANCE OF SOUTHWESTERN VIRGINIA TO THE CONFEDERATE WAR EFFORT

When Civil War broke out in 1861, Virginia was by far the leading mineral-producing state in the entire Confederacy (Dietrich, 1970). Among the principal mined materials needed to fight a war in the 1860s were salt, iron, lead, niter (saltpeter), and coal (Whisonant, 1996a). Salt was essential to pack and preserve meat and other foodstuffs; iron was needed for implements, armaments, and, most importantly, railroads; niter was the main ingredient of gunpowder; and lead was used to make bullets. Although wood still served as the principal fuel source, coal was becoming increasingly important, especially to heavy industries such as the Tredegar Iron Works in Richmond. Of all southern states, the Old Dominion ranked first in the production of each of these mineral resources except iron, where she was a close second to Alabama.

Nearly all of Virginia's salt, lead, iron, and niter production came from the Valley and Ridge province west of the Blue Ridge. Coal production centered in the Richmond Mesozoic basin but important facilities were operational in the 1860s in Mississippian-aged rocks in the Valley and Ridge of Montgomery County. The importance of southwestern Virginia's salt and lead operations to the Confederate war effort cannot be overemphasized. The lead mines at Austinville in Wythe County provided virtually all of the lead produced domestically in the South (Donnelly, 1959; Robertson, 1993a; Whisonant, 1996a),

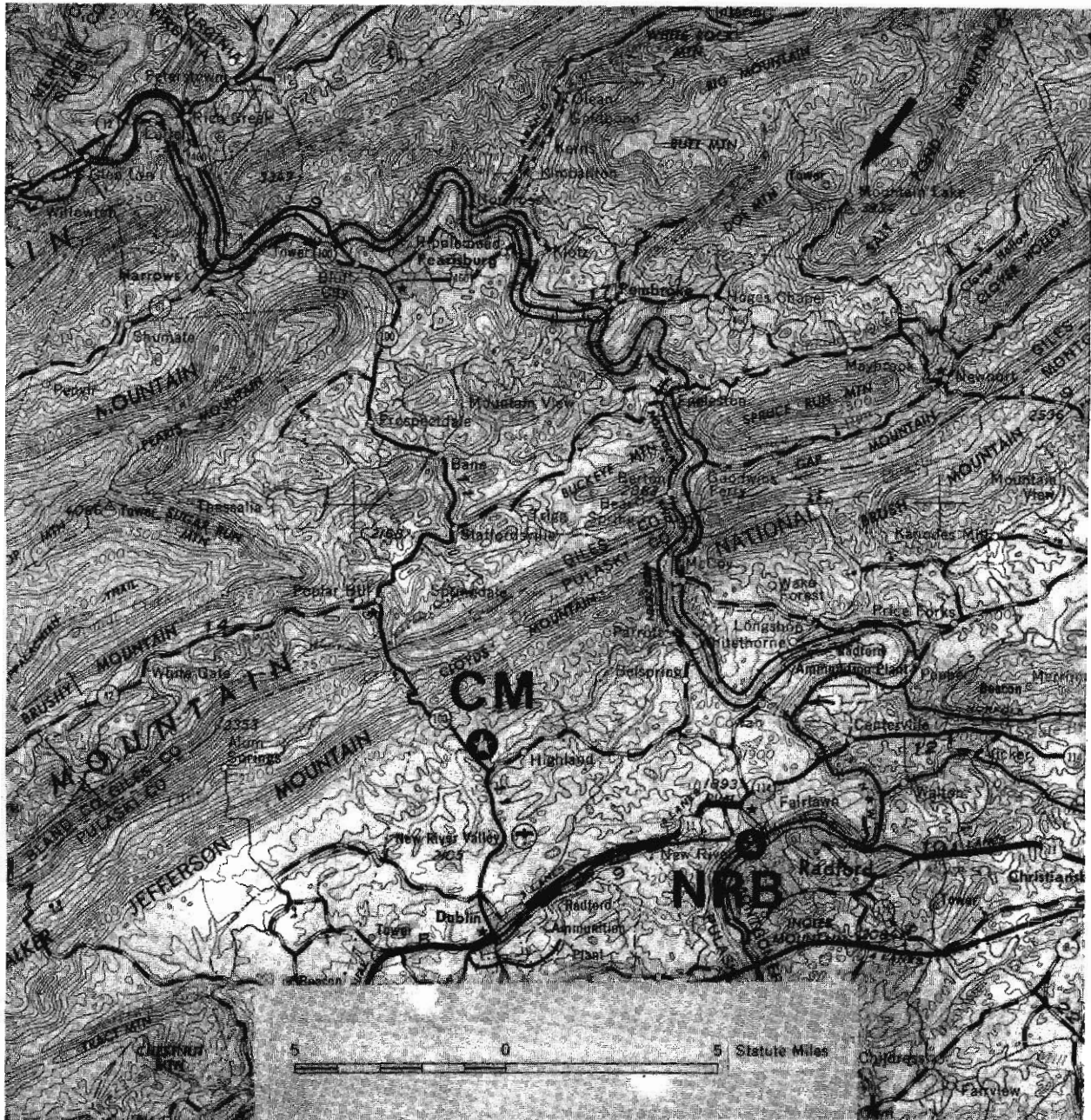


Figure 1. Location map and topography of New River Valley region showing location of Battles of Clays Mountain (CM) and New River Bridge (NRB). Arrow indicates Mountain Lake. Bluefield 1:250,000 Series, U.S. Geological Survey.

eventually contributing at least one-third of the total lead consumed by Confederate forces during the entire war.

The Saltville salt works in Smyth County constituted an equally crucial mineral resource for the South (Lonn, 1933; Marvel, 1992; Holmes, 1993; Whisonant, 1996b). After 1863, Saltville produced the great majority of the salt needed by the Confederacy, ultimately providing two-thirds of the total southern supply. During the peak year of 1864, the Smyth County facilities manufactured about 10,000 bushels (500,000 lbs.) a day of salt. Both Austinville and Saltville are located in the Valley and Ridge and, in the 1860s, each depended on the Virginia and Tennessee Railroad to get the desperately needed salt and lead to manufacturing and distribution centers in the east and west.

In 1861, Virginia had the most extensive railroad network in the South - about 20 per cent of the Confederate total.* Of all southern railroads, perhaps none was more important than the Virginia and Tennessee, which connected Richmond directly with the western theaters. This vital railroad - Lincoln himself called it "the gut of the Confederacy" - moved supplies and troops both east and west, but shipments to Richmond to feed the voracious Confederate war machine there were especially crucial.

Perhaps no single event better illustrates the Virginia and Tennessee's great significance to the Confederate war effort than its use in 1863 to transport the First Corps of General James Longstreet from the Army of Northern Virginia to reinforce the Army of Tennessee at the Battle of Chickamauga. Longstreet's

soldiers made the difference when they stormed through a gaping hole in the Union lines and precipitated a stunning Confederate victory.

The Virginia and Tennessee, built in the 1850s, ran completely through southwestern Virginia along the length of the Great Valley. The railroad extended westward from Lynchburg through a gap in the Blue Ridge near Big Lick (present-day Roanoke); there, it turned southwestward and followed the Great Valley to Bristol, a total distance of 204 miles (Noe, 1994). From Bristol, it continued on to Knoxville and Chattanooga. The Virginia and Tennessee was perhaps the best constructed and maintained railroad in the South (Marvel, 1992). Many railroads of that era were built over natural ground, but the Virginia and Tennessee had a substantial bed of stone ballast beneath every joint. The roadbed was more thoroughly ditched than any in the Confederacy, hence washouts were less frequent on this route. The weakest parts in military terms of this critical artery were the bridges, the most important of which "stood long and inviting" (Marvel, 1992) across the New River at Central Depot.

THE LAND THEY FOUGHT FOR: GEOLOGY AND GEOGRAPHY OF SOUTHWESTERN VIRGINIA

Virginia has five major geologic and physiographic provinces - the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateaus from east to west. Most of the major battles of the Civil War in Virginia were fought in the low-relief Coastal Plain ("Tidewater") and Piedmont provinces, where large armies could be handled and supplied much more effectively than in the mountainous provinces to the west. (Of course, other factors, such as the location of the two enemy capitals, also came into play.) Beyond the Blue Ridge, especially in the Great Valley immediately to the west, important military activity also occurred, as evidenced by Stonewall Jackson's brilliant valley campaign in the northern Shenandoah in 1862. And in southwestern Virginia's Valley and Ridge lay Saltville, Austinville, and the railroad, whose destruction transfixed the thinking of Federal commanders concerned with this region throughout the war.

The geologic and physiographic development of the Appalachian Valley and Ridge province is a complicated but fascinating story. This region, extending the length of the southern and central Appalachians, constitutes the miogeoclinal (continental shelf) portion of the mountain belt. In southwestern Virginia, deposition during the early stages of development (latest Precambrian to Middle Ordovician, roughly 550 to 450 million years ago) produced mostly passive margin carbonates with some shales (Figure 2). From Middle Ordovician until the late Paleozoic (around 250 million years ago), a series of orogenies introduced more and more clastic material into the miogeocline. The terminal Alleghanian orogeny, in addition to producing abundant mud, sand, gravel, and coal, also created most of the folding and thrusting seen in this region today.

The importance of the railroads to both sides during the Civil War is a generally under-appreciated story. In 1860, the United States had more railroad track mileage than the rest of the world combined (McPherson, 1988). About three-fourths of this lay in the northern states, but the 9,000 miles of track in the South still ranked it ahead of any other single country on the globe. Thus, the American Civil War became the first true railroad war - one in which troops, military supplies and weapons, food, and raw materials moved over the iron rails in decisive fashion.

Principal fold axes and thrust fault traces show a strong northeasterly strike, thereby giving this province its characteristic regional trend.

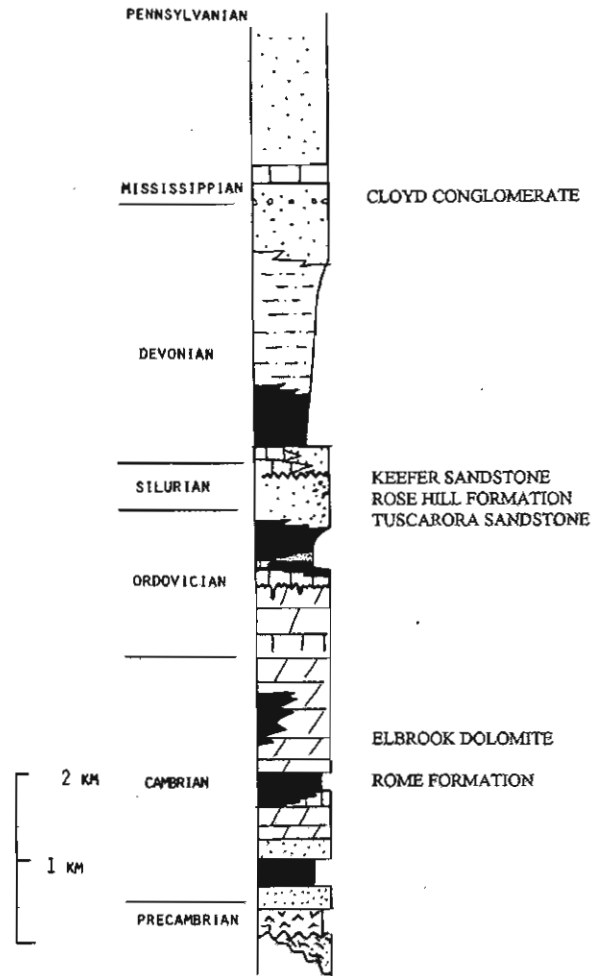


Figure 2. Stratigraphic column of Valley and Ridge in southwestern Virginia (after Read, 1983). Note valley-forming Rome and Elbrook units; the Battles of Cloyds Mountain and New River Bridge were fought on these formations. Tuscarora-Rose Hill-Keffer and Cloyd units are major ridge-formers in the region.

Because of Alleghanian deformation, rock types of differing resistances to erosional processes have been brought to the surface to create the distinctive topography of the Valley and Ridge (Figure 2). Throughout this entire province, easily eroded thick, lower Paleozoic carbonates predominate in the outcrop belt of the eastern Valley and Ridge, thus forming the extensive lowland known from Alabama to Pennsylvania as the Great Valley. Typically, the western part of the Valley and Ridge has more erosionally resistant middle and upper Paleozoic clastic sequences exposed, hence this area is dominated by high sandstone- and conglomerate-capped ridges separated by narrow limestone- and shale-floored valleys. Of these major ridge-forming units, the sandstones of the Silurian Tuscarora-Rose Hill-Keffer succession and the Mississippian Cloyd Conglomerate create many of the mountains that played such a prominent role in the New River railroad raid of 1864.

Throughout southwestern Virginia's history, the impact of this basic physiography has been profound. The Great Valley subregion offered fertile bottom land and an easy transportation corridor to early travelers (Noe, 1994). This area, then, was the first settled, the most populous and the most commercially oriented, the latter because of the presence of the region's first major thoroughfare, the Valley Road (Noe, 1994). Construction of the Virginia and Tennessee Railroad in the 1850s only exacerbated these trends. By the 1860s, the Great Valley counties, although located west of the Blue Ridge, economically and socially closely resembled the politically powerful Tidewater and Piedmont areas of Virginia because the open land permitted larger farms and made slave-holding financially viable. In contrast, counties west of the Great Valley, where topography helped create a different economy and culture, were much less tied to secession-minded eastern Virginia and thus to the Confederacy. These conflicting cultural heritages eventually resulted in the breakaway of a large portion of western Virginia's Valley and Ridge and Appalachian Plateaus counties to form the Unionist state of West Virginia in 1863.

During the Civil War, two great physiographic attributes of southwestern Virginia exerted a tremendous influence on the strategy and tactics of military campaigns. The first of these, the basic topography of the region, presented nightmarish problems to commanders on both sides, particularly Federal ones. Until very near the end of the war (December 1864), when Union General George Stoneman was at last able to advance from Knoxville and follow the trend of the Great Valley into southwestern Virginia, northern forces had to attack the region from the west. This meant moving through the treacherous, deeply dissected Plateau and across the mountainous western part of the Valley and Ridge. The steep ridges, narrow valleys, numerous streams, and poor roads here made it virtually impossible to supply a sizeable army. (Weather, too, in the form of snow or torrential rains, contributed to the headaches of army commanders.) A relatively small southern force could cut supply lines at will and starve a large army into submission (Walker, 1985). The few sizeable gaps through the mountains were especially dangerous. To illustrate, consider that a natural invasion and withdrawal route, the narrow floodplain of the New River, was never used by a major Union force to enter or exit southwestern Virginia. The great gorge at the Narrows was simply too likely to become a death trap.

In addition to the fundamental landforms of the region, the New River itself is the second great physiographic factor figuring prominently in Civil War military operations in southwestern Virginia. First encountered by European explorers in 1671 (Noe, 1994), mystery and controversy have surrounded this stream since. The New is very distinctive geomorphologically; it is the only stream in the Appalachians to flow more or less directly northwestward across three major provinces - the Blue Ridge, Valley and Ridge, and Plateau. (In the latter, the New joins the Gauley to form the Kanawha River in West Virginia.) Because of this, the New is generally considered to be one of the oldest - if not the oldest - streams in the Appalachians (Bartholomew and Mills, 1991).

Geologists have debated the precise age and physiographic history of the New River intensely. Briefly, some (e.g., Frye, 1986; Lowry, 1989) believe that the New is as old as late Paleozoic, pointing toward northwest-flowing streams that must have existed to drain the flanks of the ancestral Appalachians as early as Mississippian time, about 350 million years ago. Others (e.g., Janssen, 1952; Webb and Henika, 1994) suggest a Mesozoic age. Webb and Henika (1994) related the New's

origin to the breakup of Pangaea in the Triassic (beginning around 220 million years ago) and the westward tilting of the Blue Ridge along the Brevard fault zone. Nearly all workers agree that in the Tertiary, the New constituted the headwaters of the Teays River system. (This mighty paleoriver network, now disappeared except for the New River itself, at one time constituted the major drainage system of the east-central United States.) Studies such as Houser (1981) and Bartholomew and Mills (1991), using high-level stream sediments, document in some detail the shifting courses of the New since the late Miocene, possibly as far back as 10 million years ago. Certainly this stream in its exact present position is no older than yesterday, because - like all rivers - the New constantly changes position through erosional and depositional processes. But a late Paleozoic, ancestral New flowing down the northwestern slopes of the newly-forming Appalachians in the region of the modern river location is very possible. In that sense, the superbly misnamed New must be one of the oldest streams in the country, perhaps even the world.

Because it flows northwest across the Valley and Ridge, the New River constitutes a major barrier to movement southwest or northeast along southwestern Virginia's natural transportation corridor, the Great Valley. Builders of the Virginia and Tennessee Railroad in the 1850s confronted the problem of crossing the New by constructing a single bridge over the stream at Central Depot. This so-called "Long" bridge had a 700 foot-long wooden superstructure, covered by a tin roof, and supported by metal piers anchored in the river bottom (McManus, 1989). (The present Norfolk and Southern railroad bridge at Radford is in essentially the same location as the Civil War era structure.)

As noted earlier, because of terrain difficulties, relatively small, fast-moving forces were the only option available to Federal commanders to get at the critical mineral operations and railroad in southwestern Virginia. Destroying an entire railroad is difficult for units such as these, thus depots and bridges became the principal targets (Walker, 1985). Without question, destruction of the crucial span at Central - the "Achilles tendon" of the Virginia and Tennessee (McManus, 1989) - was the most effective way to cut the railroad. Of great interest also to Union strategists was nearby Dublin Depot, headquarters of the Confederate Department of Southwest Virginia. Significant military personnel and provisions, in addition to important railroad facilities, were located here. Determination to strike at Dublin and, above all, to demolish the New River Bridge eventually precipitated the great railroad raid of May 1864. And U.S. Grant himself was the chief architect of the Union campaign.

UNION RAIDERS IN THE NEW RIVER VALLEY, MAY 1864

In March 1864, General Ulysses S. Grant became commander of all the armies of the United States. Grant intended to crush Lee in Virginia by force of arms and by denying him supplies from the west and deep south (Johnson, 1986). To execute his grand strategy, Grant had Federal forces on the march throughout Virginia in spring of 1864. General Ben Butler moved on Richmond up the James River from Fortress Monroe in the Hampton Roads area. General Franz Sigel advanced southward in the Shenandoah Valley toward Staunton. Grant joined the Army of the Potomac in the field and pushed down from Washington, D.C., toward the Confederate capital.

The fourth major component of Grant's grand strategy in

Virginia was to strike with General George C. Crook's (Figure 3) Army of the Kanawha from Charleston, WV, through the Allegheny Mountains and sever the vital Virginia and Tennessee Railroad in the New River Valley. This idea was not original with Grant. As early as 1861, Federal commanders in West Virginia considered burning the New River Bridge (Johnson, 1986). In 1862 and 1863, a number of ill-conceived and aborted attempts to get at the railroad by Union forces took place. Colonel Rutherford B. Hayes got a command as far as Pearisburg, VA, in May 1862 before being driven back into West Virginia. Unlike these earlier fiascos, Crook's 1864 expedition had real strength behind it and even larger strategic goals. If Crook was successful, he would continue to Lynchburg, there join Federal forces advancing from the Shenandoah Valley, and thus isolate Lee completely from desperately needed resources coming from the west.

On April 29, Crook left Charleston with 6,155 soldiers, intending to attack rebel headquarters at Dublin first, then destroy the New River Bridge (McManus, 1989) (Figure 4). Among his three brigade commanders was Colonel Rutherford B. Hayes (Figure 5), an Ohioan who had served in West Virginia since the early days of the war. Within his command, Hayes had a young lieutenant in the 23rd Ohio named William McKinley (Figure 5). These two future presidents campaigned together throughout the New River Valley expedition; ironically, McKinley would survive the carnage at Cloyd's Mountain only to fall to an assassin's bullet during his presidency.

Crook's men moved jauntily up the Kanawha Valley that first day, cheered by Colonel Hayes' and several other officers' wives who followed them briefly in a small chartered stern wheeler on the river (McManus, 1989). The Federals left the Kanawha Valley on May 2 and, pelted by sleet and snow later that day, began the arduous trek over the rugged Allegheny Mountains of the Plateau. On the same day, Crook sent cavalry commander General William Averell with about 2,500 troopers to devastate the Saltville salt operations, then proceed toward Dublin, wrecking the railroad along the way. On May 6 (as Lee and Grant continued a second day of bloody battle in the Wilderness), Crook's column reached Princeton and quickly overwhelmed a small Confederate command there. The next day, Union forces entered the Valley and Ridge of Virginia along the Rocky Gap road (present-day Interstate 77), pushing rebel skirmishers before them. Along this route, they crossed East River and Wolf Creek Mountains, two high-relief ridges capped by Silurian sandstone. By the evening of May 8, another day of marching and skirmishing, Crook's army was encamped under beautiful starry skies just northwest of Cloyd's Mountain. Only two miles away, across the mountain top to the southeast, Confederate General Alfred Jenkins' hastily assembled troops waited expectantly, determined to fight to the death for Dublin and the railroad just to their rear. Tomorrow, many on both sides would be called upon to do exactly that.

The local geology and topography of the Cloyd's Mountain battle area played a critical role in the bloody events of May 9, 1864 (Figures 6 and 7). Cloyd's Mountain is a typical ridgeform of this region, supported by an erosion-resistant Devonian-Mississippian sequence dipping toward the southeast. The ridge crest is formed by the Mississippian Cloyd Conglomerate; the dip slope consists of the Price and Maccrady Formations overlying the Cloyd. These Mississippian strata are overthrust by the Cambrian Elbrook Dolomite and Rome Formation along the Pulaski fault at the base of the mountain. Back Creek, a New River tributary, flows near and in some places along the trace of the Pulaski fault at the battlefield (Figure 8). Southeast of Back Creek and the fault trace

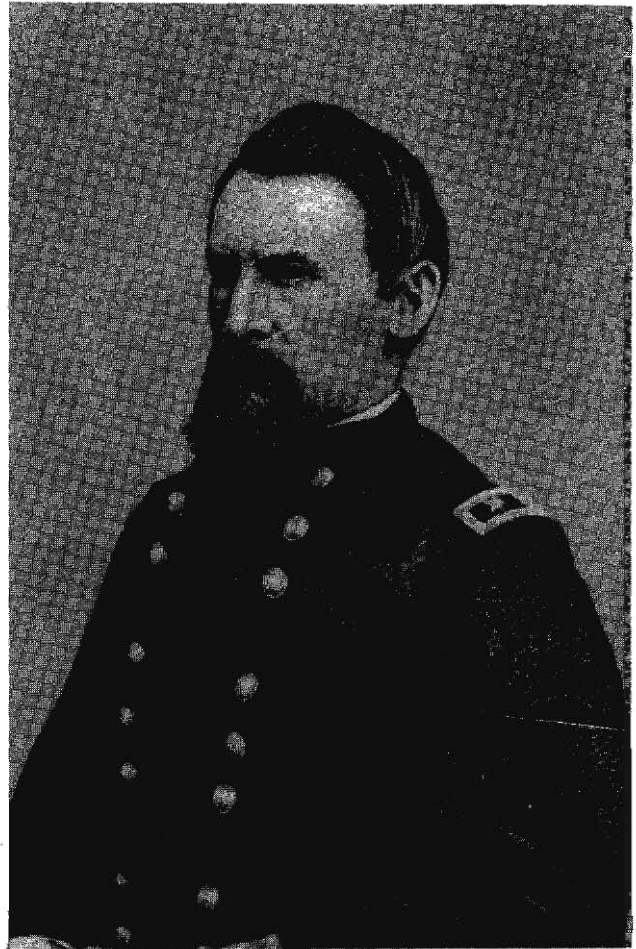


Figure 3. Union General George C. Crook (Massachusetts Commandery Military Order of the Loyal Legion and the U.S. Army Military History Institute). His May 1864 raid in the New River Valley produced dubious results. After the war, he gained greater fame as an Indian fighter and the man who captured Geronimo.

toward Dublin lies low, rolling terrain characterized by karst features developed on Cambrian carbonates. The small knolls lying athwart present-day Route 100 (the Dublin-Pearisburg Turnpike in 1864) are developed on resistant units in the Elbrook and Rome formations just southeast of the Pulaski thrust fault zone. Atop these low hills sat the Confederates, entrenched behind barricades of logs, fence rails, and earth.

Crook's soldiers moved out of camp at dawn on May 9. Expecting to meet the main Confederate forces along the mountain top, the men in blue advanced anxiously through thick brush and woods up the northwestern slope of Cloyd's Mountain. But only skirmishers awaited them at the ridge crest and these were soon driven off. Crook, upon reaching the mountain's summit, observed the half-mile long Rebel positions before him at the foot of the mountain just beyond Back Creek and opined: "The enemy is in force and in a strong position. He may whip us but I guess not" (Reader, 1890, cited in McManus, 1989).

The Federal army by now numbered 6,555 men with 12 pieces of artillery. General Jenkins had assembled 2,400 men with 10 cannons to meet the Union onslaught. The battle proper began about 11 A.M. when a brief artillery duel broke out. Soon, the entire Confederate right flank was under assault; musketry,

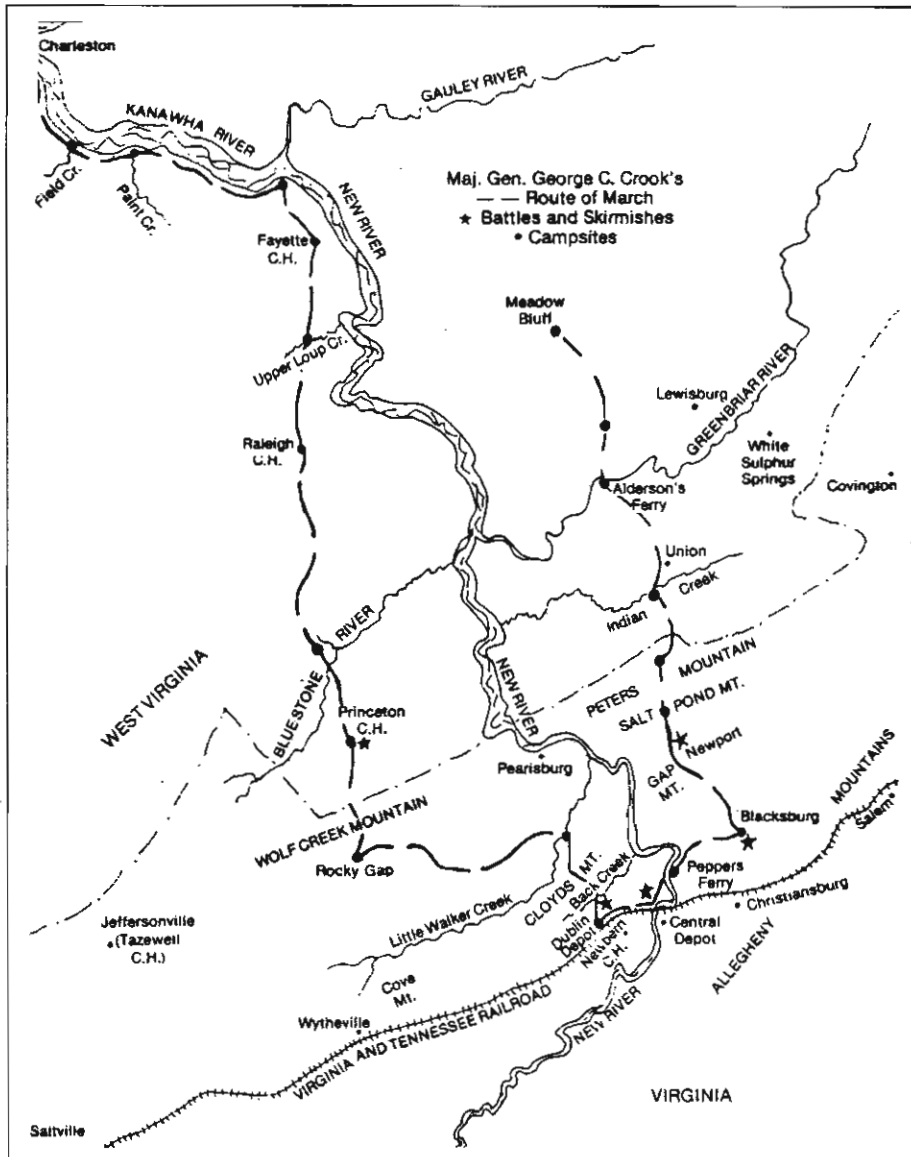


Figure 4. Map of General George Crook's 1864 New River Valley campaign (from McManus, 1989, courtesy of H. E. Howard, Inc.). Crook's army traveled a grueling 270 miles during the 21-day campaign.

grape, and canister swept the field, tearing huge holes in the Union lines. Back Creek ran red with blood. Dry leaves covering the ground caught fire and cremated an unknown number of men (Robertson, 1993b). For a few moments, the Confederates sensed victory, but at the critical time, Rutherford B. Hayes' Ohioans smashed into the Rebel right-center. Now the battle reached a murderous peak as frenzied soldiers fought hand-to-hand with clubbed muskets, bayonets, knives, and fists. Jenkins went down - later to die in a Union field hospital - when a musket ball shattered his left arm; command passed to Colonel John McCausland. The thin Confederate line began to crack and suddenly, the entire Rebel right wing collapsed. Some men began fleeing toward Dublin in panic but McCausland rallied his troops and fought a skillful rear guard action. Shortly, with much of his artillery and walking wounded safely off the field, the southern commander ordered retreat (McManus, 1989).

The Battle of Cloyds Mountain was brief (lasting only about an hour) but extremely vicious (McManus, 1989). Casualty rates

attest to the ferocity of the struggle. The Federals lost 688 men, about 10 per cent of their force. Confederate casualties were 538 soldiers, nearly 23 per cent of their command. Among the southern dead was young Captain Christopher S. Cleburne, brother of famed Confederate General Patrick Cleburne. The 21-year-old Captain Cleburne led a countercharge against the Federal troops sweeping down the turnpike that helped save McCausland's retreating forces from real disaster (Smith, 1981). Cleburne fell mortally wounded on the turnpike and asked to be buried by the roadside. This was done, but the grave was later moved a few yards away when present-day Route 100 was widened. Christopher Cleburne's lonely gravestone still keeps vigil over the battlefield at the highway wayside named in his honor. Within a few months after the Cloyds Mountain battle, Patrick Cleburne would die in the Confederate debacle at Franklin, Tennessee (Johnson, 1986).

McCausland's men abandoned Dublin following the battle that afternoon, taking many of the supplies with them. Moving eastward with his small army, the rebel colonel determined to make a stand at New River Bridge (Figures 9 and 10). During the evening of May 9, McCausland positioned his men and artillery on the southeast side of the river, concentrating his forces in fortifications near the end of the railroad bridge. Next morning, after much destruction in Dublin, Crook's Federals followed McCausland toward Central along the railroad, destroying track as they advanced. Around 10 A.M., Crook's forward skirmishers reached the high ground near the north end of the bridge. Rebel batteries immediately opened fire as the Yankees came up quickly in force. Fourteen Confederate cannons opposed 12 Union guns, but the Federal weapons were superior (McManus, 1989). Over most of the next three hours, cannons roared as Blue fought Gray for control of the bridge.

Central Depot, located about eight miles east of Dublin, in 1864 was a small railroad town of about 20 families (McManus, 1989). Most of the male population were railroad men and served in some branch of the Confederate service. In addition to New River Bridge, important railroad facilities, including a roundhouse that typically contained several engines and cars, were located there. Nestled on the south side of a large meander loop of the river, Central (like Dublin) is located on the Pulaski thrust sheet and underlain principally by carbonate-dominated rocks of Cambrian age (Figure 6); karst features are therefore very abundant (Figure 9). Steep dolomite bluffs rise some 200 feet above the river on the north (cutbank) side. South of the river (slip-off slope), elevations are generally lower where fluvial



AGE 18

WILLIAM MCKINLEY

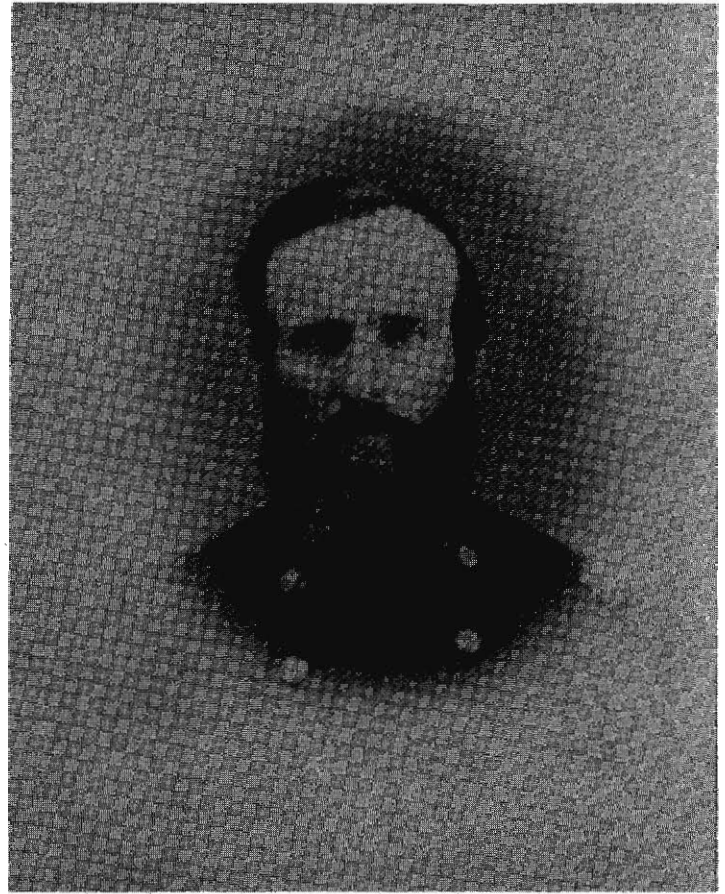


Figure 5. Union officers and future presidents Colonel Rutherford B. Hayes (right) and Lieutenant William McKinley of the First Brigade of Crook's army (Credits: Hayes, Louisa E. Kolson Collection at U.S. Army Military History Institute; McKinley, West Virginia State Archives, Boyd B. Stutler Collection). McKinley, the last Union veteran to serve as President, was shot to death by an assassin in 1901 in Buffalo, NY.

processes have formed a floodplain and river terraces. On one of the higher terraces overlooking the stream is Arnheim, the still-standing stately home of Dr. John B. Radford (Figure 11). During the cannonade, Arnheim received a number of hits as the Yankees mistakenly assumed this to be Confederate headquarters (McManus, 1989).

Several interesting local geological connections with the May 10 Battle of New River Bridge exist. First, because Federal artillerists occupied the higher ground created by the dolomite bluffs, they easily observed where their shells struck. Rebel cannons firing against the horizon saw only those shell bursts that were fired too low, a decided disadvantage in an artillery exchange (McManus, 1989). Second, one of the few casualties incurred by either side during the battle took place when a trooper under Colonel Rutherford B. Hayes refused to take refuge in one of the sinkholes near the north end of the railroad bridge (Figure 9). Johnson (1986, p. 42) quotes Hayes as telling the following story:

"There was a large lime stone sink hole," says Hayes, "in which I ordered the men to lie down. All obeyed promptly except one dismounted cavalryman who in a pert and saucy way turned to me and said, 'Why don't you get off your horse and hide too?' On my repeating the order, the cavalryman replied, 'I'll get down when you

do." Just as I was insisting on his obeying the order a shell burst near us - the cavalryman was fatally and shockingly wounded and was then discovered to be a woman. She died almost instantly."

Finally, after the battle when the Confederates had withdrawn, Union soldiers entered the Radford home but no looting or vandalism took place. Guns and silver had been hidden the day before in a cave on nearby Connelly's Run (Johnson, 1986).

Shortly after noon, Confederate fire slackened as ammunition stores ran low. Crook ordered the bridge burned, and soon flames raced rapidly through its dry timbers (McManus, 1989). The regimental band of the 23rd Ohio played a stirring tune as the troops, waving flags and cheering triumphantly, lined up along the dolomite bluffs to watch the collapsing bridge plunge into the New River. About 1 P.M., as burning pieces of timbers floated away downstream, McCausland broke off the fight. His ammunition now virtually exhausted, the southern commander withdrew toward Christiansburg, planning to defend the railroad there.

But Crook had other ideas. His major goals accomplished, the Union general turned his attention toward getting his command back to West Virginia safely. This decision was based on the Federal discovery of southern telegraph dispatches the day



Figure 6. Portion of geologic map showing geology of Clays Mountain (CM) and New River Bridge (NRB) battle area (Virginia Division of Mineral Resources, 1993). Note location of Pulaski thrust fault (PTF) with Cambrian carbonates and shales thrust onto Devonian-Mississippian sandstones and conglomerates.

before in Dublin indicating that Lee had repulsed Grant in the Wilderness. (This was erroneous information. Lee had indeed inflicted fearful losses on the Union army, but its tough-minded new commander wasn't retreating. Rather, Grant was sidestepping toward Richmond and final denouement with the Army of Northern Virginia.) Believing that Confederate forces would now be free to trap him deep in hostile territory, Crook determined to fall back to his base at Meadow Bluff, WV, as rapidly as possible.

Meanwhile, cavalryman Averell was having troubles of his own. Dispatched by Crook to attack Saltville, Averell learned upon entering Virginia that the vital salt operations were defended by no less than the ferocious General John Hunt Morgan and his terrible men. Averell switched his plans to an advance on Wytheville, targeting the Virginia and Tennessee railroad and the lead mines. But, on the very day that cannon fire thundered at Central, Morgan caught Averell near Wytheville and punished him smartly. Next day, May 11, Averell arrived in Dublin, only to find that Crook had departed toward the New River Bridge. When a detachment of Averell's cavalry finally

caught up with Crook late that same day, the only plan in either commander's mind was to fight his way back across the Valley and Ridge westward toward the security of West Virginia.

For the Federal generals, one relatively easy route - at least most of the high ridges would be avoided - would be to follow the narrow floodplain of the New River northwestward. Neither commander chose this, perhaps fearing the potential for entrapment, particularly at the great gorge through the Narrows. Upon leaving Central, Crook crossed the New River at Pepper's Ferry and advanced into Blacksburg where his army camped at Olin and Preston Institute (later to become Virginia Polytechnic Institute and State University). Next day, May 12, in a driving rain, Crook's soldiers crossed first Brush Mountain, the northeastern continuation of Clays Mountain, then Gap Mountain, passing through the narrow cleft that gives that mountain its name. According to Bartholomew and Mills (1991, p. 80), this unusual gap, cut through very hard Tuscarora-Rose Hill-Keifer sandstones, may represent a former position of the New River.

Encountering enemy resistance, Crook's command continued northwestward in the awful weather. Confederate troops harassed the Federal column as it struggled up massive Salt Pond Mountain, one of the highest (4,300 feet at the crest) of the Silurian sandstone-capped peaks in western Virginia. The climb was incredibly taxing;

the men were soon exhausted, wagons broke down, and mules dropped dead in their tracks (Johnson, 1986). Colonel Hayes (Williams, 1922, cited in McManus, 1989) recorded in his diary: "A horrible day, one of the worst of my experience." Late that night, the advance portion of Crook's weary army encamped at Mountain Lake near the peak of Salt Pond Mountain; parts of his forces were still strung out along the dreadful mountain road.

Mountain Lake (Figure 12) is perhaps the most interesting of all the geologic features involved in Crook's campaign. It is one of only two natural lakes in Virginia - Lake Drummond in the Great Dismal Swamp of the Coastal Plain is the other - and was already a well-known spa in the 1860s. Mountain Lake is unique in the unglaciated Valley and Ridge (Mills, 1988). It is located at an elevation of 3,875 feet, nearly 1,000 feet above the surrounding ridgetops and 2,000 feet above the New River less than six miles away. A number of modes of formation have been suggested, including solution activity, glacial or periglacial processes, volcanic events, meteorite impact, and even cows stomping around a salt lick on the mountain top (Dietrich, 1970; Frye, 1986). A more likely origin is damming of a typical stream valley by some sort of mass movement process, possibly involving slow transport of large

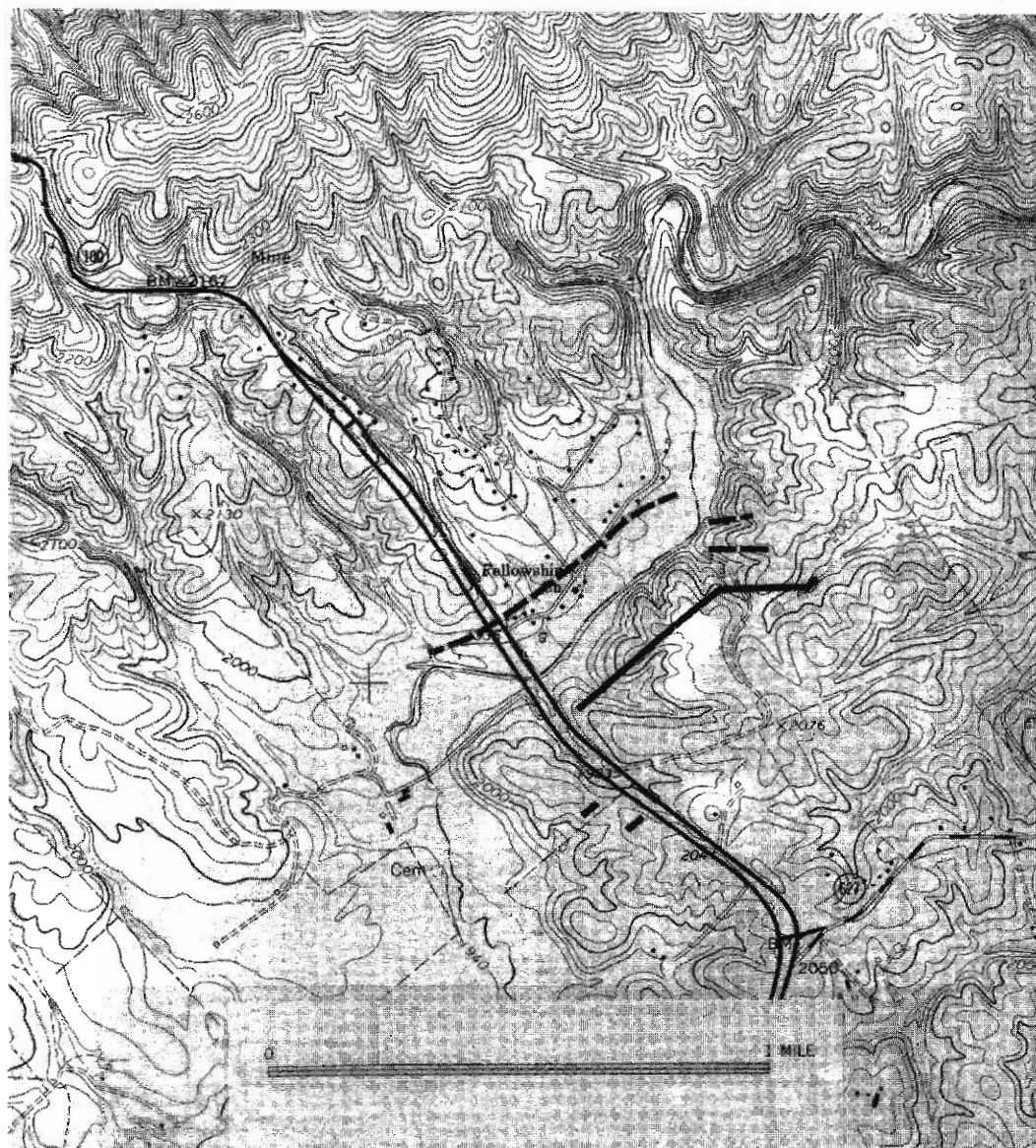


Figure 7. Topographic map with approximate Union (dashed lines) and Confederate (solid lines) positions during Battle of Cloyd's Mountain (battle lines redrawn from McManus, 1989). Note crest of Cloyd's Mountain in northwestern corner; Back Creek flows between opposing lines. Staffordsville 7.5 minute quadrangle, Pulaski County.

blocks of Silurian sandstone by periglacial processes during the Pleistocene (Mills, 1988). Recent work (Whisonant and Watts, 1993; Cato and others, 1994) suggests that a relatively rapid landslide, perhaps related to seismic activity, may have dammed the mountain stream. At any rate, the precise origin of this truly unusual lake remains enigmatic.

Descending the northwestern slope of Salt Pond Mountain on May 13, Crook's soldiers continued their torturous journey in drenching rain through the forbidding high country of the western Virginia Valley and Ridge. Skirmishing along the way, the Federals crossed a succession of Silurian sandstone peaks over 4,000 feet high, including Potts, Fork, and Peters Mountains, before descending into the Greenbrier Valley and the relative safety of West Virginia. As Crook's bedraggled troops reached their home base at Meadow Bluff on May 19, the sun at last broke through. It was the first sunshine they had seen in nine days.

Averell's soldiers fought their way to sanctuary also. Upon leaving Dublin on May 12, these cavalymen proceeded toward Christiansburg, where they tore up several miles of railroad track, burned some buildings and a water tank, and destroyed a large amount of railway and military supplies (McManus, 1989). Turning northwestward and passing through Blacksburg, Averell's command forced its way up and down the same succession of high ridges traversed by Crook's forces just a short time earlier, albeit by a somewhat different route. Averell's beleaguered troops finally rejoined Crook's column on May 15 in Union, WV; all were safe and reprovisioned when supply trains met them on May 20 and 21 in Meadow Bluff. At last, the Virginia and Tennessee railroad campaign was history.



Figure 8. Cloyd's Mountain battlefield. Left, view looking south across Back Creek valley to low hills defended by Confederates. Right, view looking east along Back Creek; note Cloyd's Mountain in background on left, low hills occupied by Rebels on right.

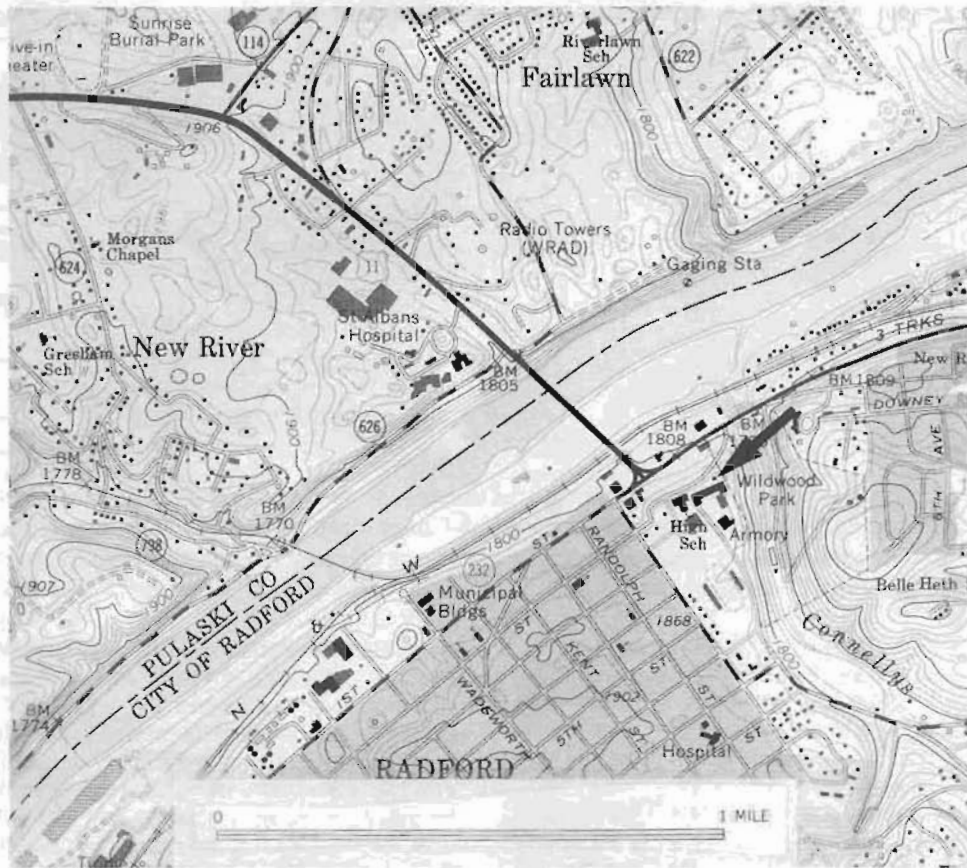


Figure 9. Topographic map of Radford showing battle area of New River Bridge. Note steep bluffs and abundant sinkholes on north side of river near railroad bridge. Arrow marks Arnheim, home of Dr. John B. Radford, on alluvial terrace. Radford North, 7.5 minute quadrangle, Pulaski County and City of Radford.

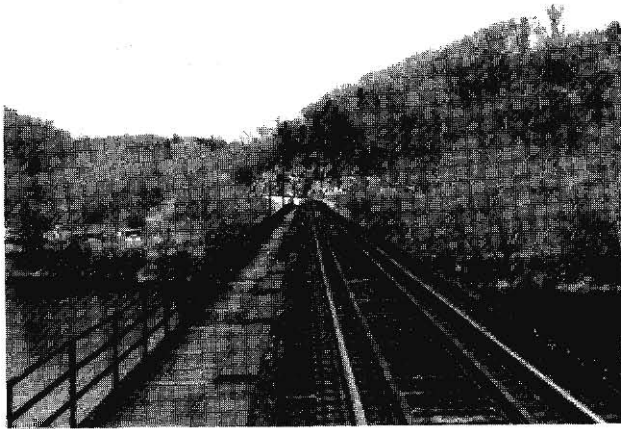


Figure 10. Modern New River railroad bridge. View looking north across bridge; note high ground on right and left where Union cannons were emplaced.



Figure 11. Arnheim, home of Dr. John B. Radford, built in 1838. Arnheim was struck by several shells during the cannonade and entered by Union soldiers afterward. Neighbors eventually got inside after the Federal troops left and found Mrs. Radford calmly knitting (Johnson, 1986).

SUMMARY AND CONCLUSIONS

But what was the significance of the Virginia and Tennessee Railroad raid of 1864? For 21 days, Crook's army had marched 270 miles through some of the most difficult terrain in the eastern United States. Seventeen rugged mountain ridges and countless streams had to be crossed (McManus, 1989). For 16 days, heavy storms plagued the troops. Crook considered the expedition a success because he destroyed facilities and supplies at Dublin and burned the New River Bridge. Others, pointing to the campaign's failure to achieve the greater strategic goals of linking up with other Federal armies to choke off Lee, concluded that the results were "hardly worth the powder" (Williams, 1922, cited in McManus, 1989).

Ironically, the centerpiece of the raid - the seemingly successful demolition of the bridge at Central - really wasn't of long-term importance. Only the wooden superstructure had



Figure 12. Mountain Lake, the "Silver Gem of the Alleghenies." View looking south toward modern lodge area. The exact origin of this unique mountain-top lake remains unclear.

burned, leaving the metal piers intact in the river. (Crook failed to bring explosives to blow up the foundation; solid shot cannon balls had bounced off harmlessly.) Within five weeks of the Battle of New River Bridge, resourceful Confederates had the span completely rebuilt, this time using fire-resistant green timber. Despite a later attempt to fire the bridge once more, this new structure would not ignite (Walker, 1985). It survived to the very end of the war.

Today, few people - even those interested in the Civil War - know much about the events of May 1864 in the New River Valley. And yet, this ancient stream flows on, perhaps in some way keeping silent witness to the valor of the soldiers, male and female, who fought and died at Cloyd's Mountain and New River Bridge.

ACKNOWLEDGEMENTS

This article is part of an ongoing study examining the relationship between the geology of southwestern Virginia and the Civil War military history of that region. I am grateful to Stan Johnson, Palmer Sweet, and Gene Rader of the Division of Mineral Resources for their help during the project. As concerns this New River Valley article, I thank Howard McManus and Linda Killen, historians in the area, for information about the battles. I particularly appreciate the help of Ms. Sharon Holloway, who prepared the manuscript.

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